

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P-PWU-491WO		FOR FURTHER ACTION See Form PCT/PEA/416	
International application No. PCT/EP2004/053264	International filing date (day/month/year) 03.12.2004	Priority date (day/month/year) 03.12.2003	
International Patent Classification (IPC) or national classification and IPC C21B7/10			
Applicant PAUL WURTH S.A.			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 7 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand 02.07.2005		Date of completion of this report 05.12.2005	
Name and mailing address of the international preliminary examining authority:  European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer Ceulemans, J Telephone No. +31 70 340-3157	




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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2004/053264

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4)
 - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1, 2, 5-7, 9-18	as originally filed
3, 4, 8	received on 07.10.2005 with letter of 03.10.2005

Claims, Numbers

1-34	received on 07.10.2005 with letter of 03.10.2005
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Drawings, Figures

1-15	as originally filed
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- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
 - ☐ any table(s) related to sequence listing (*specify*):

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2004/053264

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-34
	No: Claims	
Inventive step (IS)	Yes: Claims	1-34
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-34
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: DATABASE WPI Section Ch, Week 197619 Derwent Publications Ltd., London, GB; Class J08, AN 1976-35010X XP002282752 -& JP 51 035661 A (NIPPON ALUMIN MFG) 26 March 1976 (1976-03-26)
- D2: GB-A-2 079 655 (CONNELL JOHN O; REDPATH ENGINEERING LTD) 27 January 1982 (1982-01-27)
- D3: DE 33 13 998 A (VOEST ALPINE AG) 8 December 1983 (1983-12-08)
- D4: EP-A-1 156 124 (KM EUROPA METAL AKTIENGESSELLSCHAFT) 21 November 2001 (2001-11-21)
- D5: DATABASE COMPENDEX [Online] ENGINEERING INFORMATION, INC., NEW YORK, NY, US; ABDULALIYEV Z E ET AL: "Analysis of stresses in tube sheet of heat exchanger by three dimensional models" XP002282751 Database accession no. EIX99254647555

The document D3 is regarded as being the closest prior art to the subject-matter of claims 1 and 24, and shows (the references in parentheses applying to this document): a cooling plate for a metallurgical furnace, providing a metallic plate body with at least one channel extending through and within said plate body. A metallic tube is inserted into said channel, with its ends protruding from said channel. The tube will have a press-fit connection to the plate body in use, due to thermal expansion of the tube beyond the diameter of the channel in use.

The subject-matter of claim 1 differs from this known process in that a metal-forming process is applied to the plate body in order to achieve the press-fit connection between the tube and the body.

The subject-matter of claim 24 differs from this known cooling plate in that a plastic deformation is present in the plate body along the channel providing a press-fit connection between the tube and the body.

The subject-matter of claims 1 and 24 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as providing a more cost-effective way of obtaining a press-fit connection between the cooling pipe and the plate body.

The solution to this problem proposed in claims 1 and 24 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons. In order to obtain the press-fit connection, a metal-forming process is applied to the metal plate body. The cooling plate is locally plastically deformed, thereby ensuring the press-fit. D1 and D2 disclose a process for obtaining a press-fit connection between a tube and a sheet by pressing a tube into a groove or slit in the surface of the sheet and thereby deforming the tube to achieve the press-fit connection.

Although the disclosures of D1 and D2 concern heat exchanging devices, they do not consider cooling plates for a metallurgical furnace, i.e. plate bodies with cooling channels running through and embedded within ; on the contrary, both consider relatively thin sheets with no structural function and which are not thick enough for cooling pipes to run through them.

Hence the person skilled in the art would not have been led by the disclosure of either of D1 or D2 to apply a metal-forming operation to the metal body of a cooling plate for a metallurgical furnace, incorporating cooling tubes within said body, to obtain a press-fit connection between said body and said tubes by means of a local plastic deformation of the plate body.

Claims 2-23 and 35-34 are dependent on claim 1, 24 respectively, and as such also meets the requirements of the PCT with respect to novelty and inventive step.